

REMARKS

In the Office Action under reply, the Examiner required restriction between the following groups of claims:

- Group (I): claims 1-129, drawn to a method for generation of a small fluid volume;
- Group (II): claims 130-143, drawn to a spatial array comprising a plurality of small fluid volumes; and
- Group (III): claims 144-150, drawn to a method for detecting crystals in a fluid.

Although Group (I) was provisionally elected via telephone with traverse, applicants now affirm the election of Group (I) but withdraw the traversal.

With respect to the claims under consideration, the Examiner objected to claim 66 as being a substantial duplicate of claim 46. In addition, the Examiner rejected claims 1-129 under 35 U.S.C. §112, second paragraph, as being indefinite.

The Examiner also issued a number of art-based rejections. The claims stand rejected over the art, as follows:

- (1) Claims 1-37, 41-45, 47-65, 67-72, 75-106, 109-126, 128, and 129 stand rejected under 35 U.S.C. §103(a) as obvious over U.S. Patent No. 6,296,673 to Santarsiero et al. ("Santarsiero") in view of U.S. Patent No. 5,565,113 to Hadimioglu et al. ("Hadimioglu") and Hey et al. (1998) Proceedings –IEEE Annual International Workshop on Micro Electro Mechanical Systems: An Investigation of Micro Structures, Sensors, Actuators, Machines and Systems, 11th, Heidelberg, Jan. 25-29, 1998, 429-431(Abstract) ("Hey"); and
- (2) Claims 38-40, 46, 66, 73, 74, 107, 108, and 127 stand rejected under 35 U.S.C. §103(a) as obvious over Santarsiero in view of Hadimioglu, Hey, and Lube et al. (1989) Journal of Crystal Growth, 98(4):817-26 (Abstract) ("Lube") or Subramanian et al (1997) IEEE Electron Device Letters, 18(8):378-381 ("Subramanian").

The rejections are addressed in part by the above amendments to the claims and are otherwise traversed for reasons that will be discussed in detail below.

THE ABOVE AMENDMENTS:

Independent claims 1, 43, 78, 116, and 124 have been amended to indicate that the inventive system includes a reservoir and an ejector, wherein at least one which is moveable relative to the other, and that the inventive methods use such a reservoir/ejector combination. Support for these amendments can be found in the application on page 36, lines 16-23. In addition, clarifying amendments of a clerical nature have been made to claims 1, 3, 26-32, 37-44, 46, 47, 64-68, 72-78, 80, 91, 98, 99, 101, 102, 106-109, 116-119, 121, and 124.

Thus, no matter has been introduced by way of any these amendments and entry thereof is proper and requested.

STATUS OF THE CLAIMS:

With the above amendments, claim 1-150 are pending, claims 130-150 are withdrawn, claims 1, 3, 26-32, 37-44, 46, 47, 64-68, 72-78, 80, 91, 98, 99, 101, 102, 106-109, 116-119, 121, and 124 are amended, and claims 2, 4-25, 33-36, 45, 48-63, 69-71, 79, 81-90, 92-97, 100, 103-105, 110-115, 120, 121-123, and 125-129 are unaltered.

"DOUBLE PATENTING" OBJECTION:

Under the heading of "Double Patenting," the Examiner objected to claim 66 as being a substantial duplicate of claim 46. In response, applicants have amended claim 66 to change its dependencies. As a result, claims 46 and 66 now depend from the different claims. Accordingly, withdrawal of the double patenting rejection/objection is warranted and respectfully requested.

REJECTION UNDER 35 U.S.C. §112, SECOND PARAGRAPH:

The Examiner rejected claims 1-129 under 35 U.S.C. §112, second paragraph, as being indefinite. As an initial matter, the Examiner objected to the term "small" as a "relative term." In addition, the Examiner states that the term "the nucleic acid" in claim 91, misidentified as claim 90 in the Office Action, lacks antecedent basis. Contending that any nucleic acid has a conformation, the Examiner states that the "conformation" element in claim 91 is unclear.

In response, applicants note that the term "small" has been deleted from the claims. In addition, the dependency of claim 91 has been changed to provide proper antecedent basis for all claim terminology. Furthermore, claim 91 has been amended to clarify that the nucleic acid has a stabilized conformation. Thus, all claims are definite, and withdrawal of the rejection is respectfully requested.

THE REJECTION OF CLAIMS 1-37, 41-45, 47-65, 67-72, 75-106, 109-126, 128, AND 129:

Claims 1-37, 41-45, 47-65, 67-72, 75-106, 109-126, 128, and 129 stand rejected under 35 U.S.C. §103(a) as obvious over Santarsiero in view of Hadimioglu and Hey. In issuing this rejection, the Examiner cites Santarsiero as disclosing methods and apparatus for performing microcrystallizations to determine suitable crystallization conditions for a molecule. While the Examiner has recognized that Santarsiero does not disclose acoustic deposition of droplets, she points to Hadimioglu as providing the missing teaching relating to acoustic ejection. In particular, the Examiner cites column 1 of Hadimioglu

as disclosing acoustic deposition of biological molecules such as proteins. In addition, the Examiner cites Hey as disclosing that acoustically formed droplets may range from pico- to nanoliters in volume.

In response, applicants point out that Santarsiero and Hadimioglu are generally directed to unrelated technologies. That is, Santarsiero pertains to microcrystallization techniques whereas Hadimioglu is directed primarily to lithographically defined ejector units. While Hadimioglu briefly mentions the deposition of biomolecules, such deposition is limited to the context of bioelectronics. One of ordinary skill in the art would not have been motivated to combine the teaching of a patent that briefly mentions protein deposition in a bioelectronics context with the teachings of a patent pertaining to microcrystallization techniques.

Nevertheless, to expedite prosecution and with no intention to acquiesce in the Examiner's rejection, applicants have amended the claims such that they set forth subject matter that involves the use of *a reservoir and an ejector, wherein at least one which is moveable relative to the other*. Thus, even if Santarsiero were read together with Hadimioglu and Hey, the references would neither teach nor suggest all the claim limitations. Furthermore, the cited references effectively teach away from the subject matter of the claims under examination. In particular, FIG. 5 of Hadimioglu depicts ejector units, indicated at reference numerals 204 and 206, which are each associated with a reservoir containing fluid to be ejected, indicated by reference numeral 256. This drawing indicates that each ejector of Hadimioglu is immovably fixed to an associated reservoir. Accordingly, withdrawal of this rejection is proper and respectfully requested.

THE REJECTION OF CLAIMS 38-40, 46, 66, 73, 74, 107, 108, and 127:

Claims 38-40, 46, 66, 73, 74, 107, 108, and 127 stand rejected under 35 U.S.C. §103(a) as obvious over Santarsiero in view of Hadimioglu, Hey, and Lube or Subramanian. In issuing this rejection, the Examiner states that Santarsiero in view of Hadimioglu and Hey does not teach the acoustic detection of crystals. However, the Examiner points to Lube and Subramanian as providing such a teaching. In particular, the Examiner cites Subramanian, page 379, left column, as disclosing that acoustic technologies represents a detection method that is more sensitive than conventional X-ray crystallography.

In response, applicants note that the Examiner provides no reason as to why Lube or Subramanian should be read together with Santarsiero, Hadimioglu, and Hey. In addition, were Lube or Subramanian read with Santarsiero, Hadimioglu, and Hey, relative motion between a reservoir and an ejector would not be taught or suggested. Since neither Lube nor Subramanian provides the missing teaching concerning such relative motion, withdrawal of this rejection is respectfully requested.

CONCLUSION

For all of the above reasons, it is submitted that the application comports with all requirements of 35 U.S.C. §112, and that the pending claims define an invention that is patentable over the art. As the application should now be in condition for allowance, a prompt indication to that effect would be appreciated.

If the Examiner has any questions concerning this communication, she is welcome to contact the undersigned attorney at (650) 330-0900.

Respectfully submitted,

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